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SEASAT DATA UTILIZATION: SCANNING MULTICHANNEL MICROWAVE RADIOMETER

Continuing evaluation of the 1978 Seasat's Scanning Multichannel Microwave Radiometer (SMMR) data advanced the accuracy of several oceanographic determinations this year. Improved algorithms were formulated for retrieving sea surface temperature, surface wind speed, atmospheric liquid and water vapor, and rain rate.

A series of workshops compared Seasat spacecraft data with surface observations made during the mission, identified problems in earlier sensor and geophysical algorithms, and evaluated subsequent approaches to their solutions.

Accuracies of SMMR geophysical readings were assessed by a Joint Air-Sea Interaction (JASIN) workshop in March 1980, as follows:

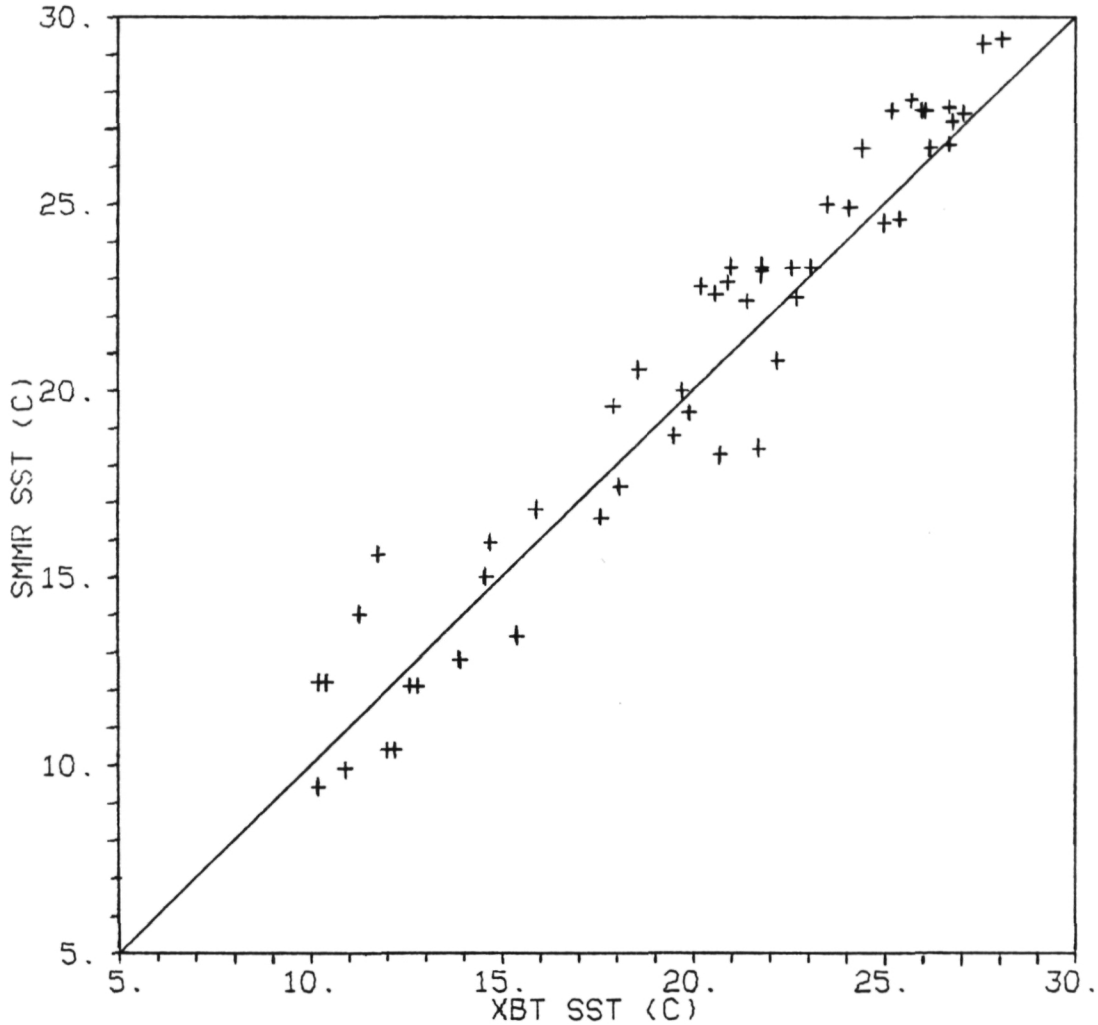
Sea surface temperature (SST) estimates in the northern and western Pacific when rain and sunglint are absent show a deviation of 1.5 degrees Celsius about a warm bias of 0.6 degrees Celsius. (Figure opposite shows this comparison made during descending Seasat passes.) In areas of heavy radio frequency interference (RFI), such as the JASIN area between Great Britain and Ireland, SST determinations degrade markedly.

Wind Speed retrievals in the northeast Pacific and northwest Atlantic had a scatter of 2.5 meters per second (bias 0.5 m/s) at least 150 kilometers away from land and rain. In the JASIN area wind estimates were degraded by RFI and possibly land contaminations.

Atmospheric water vapor in the JASIN area was measured within an 0.1-gram-per-square-centimeter accuracy compared to surface readings taken within +2 hours of the overpass. In the tropics, retrievals are 15 percent high, but some land contamination may be present.

The SST, wind speed, and atmospheric water determinations, uncontaminated by land, rain, and sunglint, fell within mission specifications.

Figure (opposite page): SMMR SST comparisons with high-quality surface truth taken in the open Pacific. The spacecraft data are from descending passes (night time), uncontaminated by rain. The surface truth, from expendable bathythermographs (XBT), is accurate to 0.2°C. The comparisons, shown clustering around the perfect agreement line over a 20°C range in SST, have a 1.5°C scatter about a 0.6°C warm bias.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